

3-1

Practice

Form G

Lines and Angles

Use the diagram to name each of the following.

1. a pair of parallel planes one of the following pairs:
 $QRTS$, $UVXW$; $QUWS$, $RVXT$; $STXW$, $QRVU$

2. all lines that are parallel to \overleftrightarrow{RV}

\overleftrightarrow{TX} , \overleftrightarrow{QU} , \overleftrightarrow{SW}

3. four lines that are skew to \overleftrightarrow{WX}

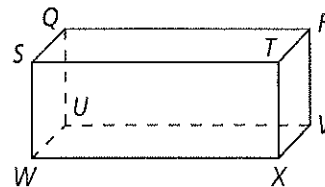
Answers may vary. Sample: \overleftrightarrow{TR} , \overleftrightarrow{QS} , \overleftrightarrow{RV} , \overleftrightarrow{QU}

4. all lines that are parallel to plane $QUVR$

Answers may vary. Sample: \overleftrightarrow{ST} , \overleftrightarrow{TX} , \overleftrightarrow{WX} , \overleftrightarrow{SW}

5. a plane parallel to plane $QUWS$

$RVXT$

In Exercises 6–11, describe the statement as *true* or *false*. If false, explain.

6. \overleftrightarrow{AE} and \overleftrightarrow{EF} are skew lines.

False; \overleftrightarrow{AE} and \overleftrightarrow{EF} intersect.

7. plane $DBF \parallel$ plane ABD

False; the planes intersect.

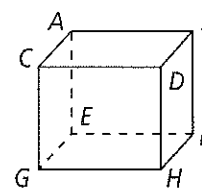
8. $\overleftrightarrow{GH} \parallel \overleftrightarrow{EF}$ true

9. $\overleftrightarrow{DB} \parallel \overleftrightarrow{AE}$

False; the lines are skew because they are noncoplanar.

10. plane $EFH \parallel$ plane ABD true

11. \overleftrightarrow{FH} and \overleftrightarrow{CD} are skew lines. true



12. You are driving over a bridge that runs east to west. Below the bridge, a highway runs north to south. Are the bridge and the highway *parallel*, *skew*, or *neither*? Explain.

Skew; because the bridge is above the highway and they run in different directions, they are noncoplanar and cannot intersect.

13. **Open-Ended** List parts of your classroom that fit each description below.

- a. parallel to the top of a window
 Sample: bottom of the window

- b. skew with one side of the door
 Sample: top of the chalkboard

- c. parallel to the plane of the floor
 Sample: plane of the ceiling

14. **Reasoning** Your friend says that the sides of a ladder and the rungs of a ladder are skew. Is this true? Explain.

No; the rungs of a ladder and the sides of a ladder intersect. Skew lines do not intersect.

15. **Visualization** If two planes are parallel, must all lines within those planes be parallel? Explain.

Answers may vary. Sample: No; even if the planes are parallel, the lines could be skew. It depends upon the direction of the lines.

3-1

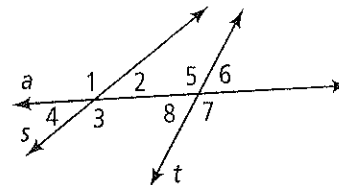
Practice (continued)

Form G

Lines and Angles

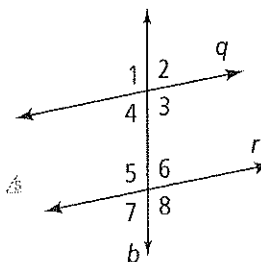
Identify all pairs of each type of angle in the diagram below right.

16. corresponding angles
 $\angle 1$ and $\angle 5$; $\angle 2$ and $\angle 6$; $\angle 4$ and $\angle 8$; $\angle 3$ and $\angle 7$
17. same-side interior angles
 $\angle 2$ and $\angle 5$; $\angle 3$ and $\angle 8$
18. alternate interior angles
 $\angle 3$ and $\angle 5$; $\angle 2$ and $\angle 8$
19. alternate exterior angles
 $\angle 1$ and $\angle 7$; $\angle 4$ and $\angle 6$



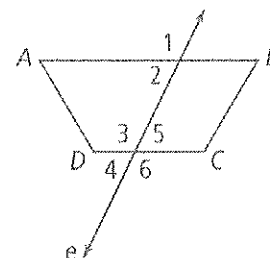
Decide whether the angles are *alternate interior angles*, *same-side interior angles*, *corresponding angles*, or *alternate exterior angles*.

20. $\angle 2$ and $\angle 7$ alt. ext. \triangle
21. $\angle 5$ and $\angle 4$ same-side int. \triangle
22. $\angle 8$ and $\angle 3$ corr. \triangle
23. $\angle 6$ and $\angle 4$ alt. int. \triangle
24. $\angle 1$ and $\angle 5$ corr. \triangle



25. **Draw a Diagram** Line e intersects trapezoid $ABCD$. Sketch a diagram that meets the following conditions.

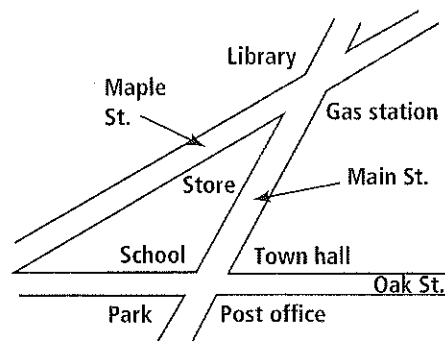
- a. \overleftrightarrow{AB} and \overleftrightarrow{DC} are parallel. Answers may vary. Sample:
- b. $\angle 1$ and $\angle 6$ are alternate exterior angles.
- c. $\angle 2$ and $\angle 3$ are same-side interior angles.
- d. $\angle 4$ and $\angle 5$ are each supplementary to $\angle 3$.



26. **Writing** Describe three real-world objects that represent two lines intersected by a transversal. Answers may vary. Samples: The sides of window panes are parallel lines intersected by the transversal of the center strip. Train track ties are transversals intersecting the parallel rails. In a bridge framework, the crosspieces intersect parallel and non-parallel lines.

27. The map at the right shows the intersection of Maple Street and Oak Street by Main Street. Name the angle pairs represented by the locations listed below.

- a. town hall and gas station same-side interior
- b. school and library corresponding
- c. library and post office alternate exterior
- d. school and gas station alternate interior



3-1

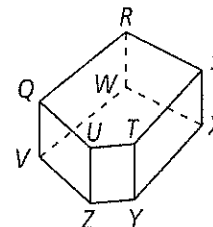
Practice

Form K

Lines and Angles

Use the diagram to name each of the following.

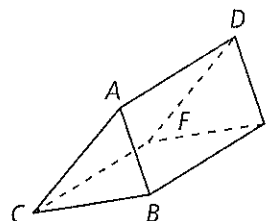
- a plane Answers may vary. Sample (one of the following): $QRSTU$, $VWXYZ$, $QRWV$, $RSXW$, $SXYT$, $UTYZ$, $QUZV$
- a pair of parallel planes Answers may vary. Sample (one of the following): $RSWX$ and $QUVZ$; $TSXY$ and $QRWV$; $QRSTU$ and $VWXYZ$
- all lines that are parallel to \overleftrightarrow{QR} , \overleftrightarrow{VW} , \overleftrightarrow{TS} , and \overleftrightarrow{YX}
- two lines that are skew to \overleftrightarrow{ST} Answers may vary. Sample (two of the following): \overleftrightarrow{UZ} , \overleftrightarrow{QV} , \overleftrightarrow{RW} , \overleftrightarrow{WX} , \overleftrightarrow{ZY} , and \overleftrightarrow{VZ}
- all lines that are parallel to plane $TSXY$ \overleftrightarrow{VW} , \overleftrightarrow{QR} , \overleftrightarrow{RW} , \overleftrightarrow{UZ} , and \overleftrightarrow{QV}



In Exercises 6–9, describe the statement as *true* or *false*.

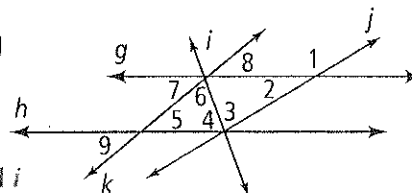
If false, explain.

- $\overleftrightarrow{AB} \parallel \overleftrightarrow{DE}$ true
- plane $ABE \parallel$ plane ACF False; the planes intersect.
- plane $ABC \parallel$ plane DEF true
- \overleftrightarrow{AD} and \overleftrightarrow{BE} are skew lines. False; they are parallel.



Identify all pairs of each type of angles in the diagram. Name the two lines and the transversal that form each pair.

- corresponding angles $\angle 8$ and $\angle 5$, lines g and h and transversal k ; $\angle 7$ and $\angle 2$, lines k and j and transversal g ; $\angle 7$ and $\angle 9$, lines g and h and transversal k
- alternate interior angles $\angle 5$ and $\angle 7$, lines g and h and transversal k ; $\angle 8$ and $\angle 2$, lines k and j and transversal g ; $\angle 6$ and $\angle 3$, lines k and j and transversal i
- same-side interior angles $\angle 5$ and $\angle 4$, lines k and i and transversal h ; $\angle 6$ and $\angle 4$, lines k and h and transversal i ; $\angle 5$ and $\angle 6$, lines h and i and transversal k ; $\angle 8$ and $\angle 1$, lines k and j and transversal g ; $\angle 2$ and $\angle 3$, lines g and i and transversal j
- alternate exterior angles $\angle 8$ and $\angle 9$, lines g and h and transversal k



3-1

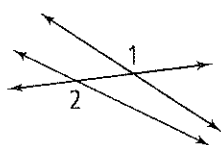
Practice (continued)

Form K

Lines and Angles

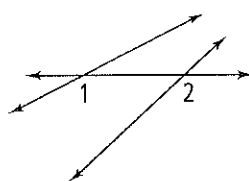
Decide whether each pair of angles labeled are *alternate interior angles*, *same-side interior angles*, *corresponding angles*, or *alternate exterior angles*.

14.



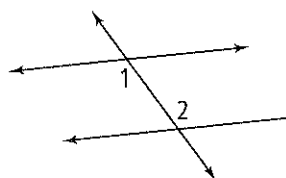
alternate exterior

16.



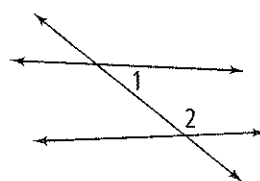
corresponding

15.



alternate interior

17.



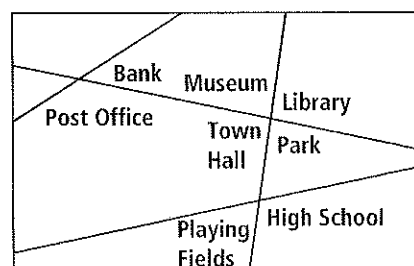
same-side interior

18. **Error Analysis** A student drew a square pyramid. She said the lines forming the sides of the square base of the pyramid are skew to the lines forming the triangular sides. Explain the student's error. The lines forming the sides of the square intersect the lines forming the triangular sides. Skew lines do not intersect.

19. **Open-Ended** Draw a three-dimensional figure with at least one pair of parallel planes, two pairs of parallel lines, and three pairs of skew lines. Check students' work.

20. Use the words *lines* and *transversal* to explain what makes an angle an interior angle or an exterior angle. Interior angles are between the two lines intersected by the transversal. Exterior angles are outside the two lines intersected by the transversal.

21. The map at the right shows the downtown area of a city. Name two pairs of locations that represent each type of angle.



- alternate interior angles bank and town hall; museum and post office
- same-side interior angles post office and town hall; bank and museum
- alternate exterior angles library and playing fields, museum and high school
- corresponding angles Answers may vary. Sample (any two of the following pairs): post office and park, bank and library, town hall and playing fields, park and high school